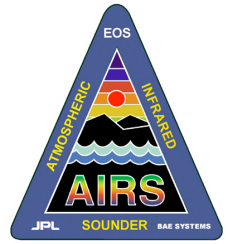


Validation of Level 2 Products: The First Year

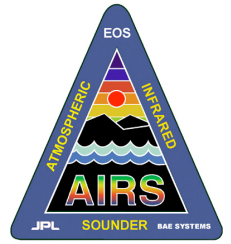
Eric Fetzer

AIRS Science Team Meeting

May, 2002

Solvang

A first year schedule



JPL

L+Months	Event
2.5	Val. Site Decision (ARM etc. go / no-go)
3	Final gain table uploaded
5	*v2.7 build at TDS; reprocess Level 1B
5.5	End dedicated observations
7	RTA for first year validation Ship v2.7 Level 1B to DAAC
9	*v3.0 build at TDS; reprocess val. set Level 2 **Public release of v2.7 Level 1B at DAAC**
10	Ship v3.0 to DAAC
11	Validation reports for v3.0
12	**Public release of v3.0 Level 2 at DAAC**

*v2.7 = Level 1B for public release; *v3.0 = Level 2 for public release

In Tradeoff Space no one can hear you scream

- Many validation data sets will be acquired well before Level 2 is stable
  - e. g. ARM CART acquired at L+2.5-5.5 months
- AIRS L1B is stable around L+5, so reprocessing begins.
- Final Level 2 fiddling starts with RTA delivery at L+7
- Level 2 v3.0 due at JPL at L+9
- First year validation report due L+11 for distribution and review
  - Need Science Team contributions

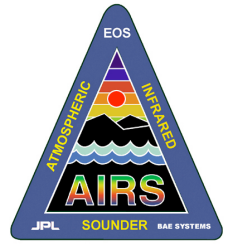
THEREFORE

We have as little as 2 months to refine the Level 2 algorithms

-- and --

We have limited resources for reprocessing

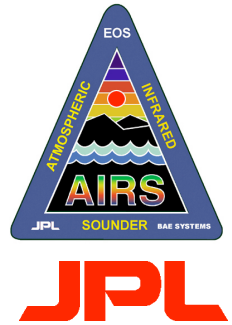
Science Team Validation Activities from Val Plan of Jun 2000



JPL

H. H. Baumann: Calibration and Level 1B radiometric validity during instrument checkout; sea surface properties. Correlation with MODIS surface IR.
M. T. Chahine: Verification of Vis/NIR measurements; Infrared Cloud Properties, VIS/IR cloud properties correlation. Correlation with MODIS cloud properties.
C. Gautier: Verification of Vis/NIR calibration. Validated clear sky conditions from Vis/NIR measurement. Validation of VIS cloud properties.Correlation with MODIS Land VIS.
M. Goldberg: Global validation of level 1B (EOF decomposition).. Validation of the first products. Cross-validation with NOAA-15 and –16.
Eugenia Kalnay: Validation of AIRS level 1B clear data by assimilation of AIRS level 1B into analysis.
L. McMillin): Validation small angle correction and interpolation. Validation of tuning software. Validation of temperature and moisture profile using global statistics.
H. Revercomb: Evaluate Level 1B, ARM-CART site observations and synthesis of atmospheric state from these measurements for intensive spot validation of AIRS product. Land surface temperature and emissivity.
P. W. Rosenkranz: AMSU Level 1B validation. Microwave-only retrievals of temperature and humidity.
W.L. Smith: Support of surface emissivity product validation using Aircraft (NAST-I).
D. Staelin: HSB Level 1B. Validation of precipitation. Cross-validation of precipitation with NEXRAD data.
L. L. Strow: SRF shape validation. Forward model validation starting with clear sky radiance measurements. Minor gas retrieval software validation.
J. Susskind: Validation of "clear flag". Validation of the cloud-clearing algorithm and cloud-cleared radiance product. Validation of derived IR cloud properties. Validation of Final Product quantities and error bars.

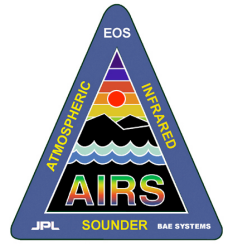
Validation Datasets: Dedicated Sonde Launches



- ARM CART and others sites geared to go:
  - Three ARM sites -- SGP, NSA, TWP (Cress, Tobin)
  - Two Brazilian sites (Calheiros)
  - Two European sites (Schluessel, Huang)
    - Two Australian sites still in limbo (Le Marshall)
- Dave Tobin has automated the ARM processing
  - ready for routine daily ingestion at TDS (Stephen Leroy)
- Allen Huang is processing international sites' data
  - ready for routine daily ingestion at TDS (Stephen Leroy)

All are waiting for the go-ahead around L+2-3 months.

Validation Team Field Experiments

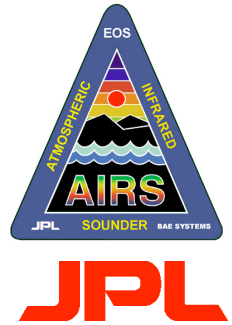


JPL

PI / Experiment	Coordination	NetCDF?	In TDS?
Barnes Mauna Loa Lidar	Waiting for go-ahead	Yes	?
Bennartz Baltic radar	Operational	Yes	No
McMillan ocean platform	Waiting for go-ahead	Yes	No
Minnett ships	Operational, cruises	No	No
Newchurch ozonesondes	Waiting for go-ahead	No	No
Schmidlin sondes	Busy, but ready	?	No
Vömel sondes	Busy, but ready	Yes	Yes
Whiteman lidar	Waiting for go-ahead	No	No
Yoe GPS receivers	Operational	Yes	No
Walden in Antarctica	Austral Summer -- ~L+7!	Yes	Yes

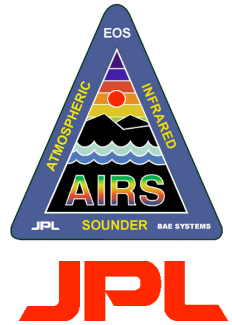
NOTE: All sites are matched to AIRS data

Additional Validation Data Sets



- Denise Hagan will start analyzing Surface Marine around L+2 months
- Radiosondes are pouring in
  - Hundred of daily match-ups, will to be analyzed *a posteriori* around L+5-7 months.
- ACARS/MOZAIC data acquired from the get-go
  - More L+5-7 months processing.
- The Golden, er, *Focus* Day for extensive comparison with AVN & ECMWF is currently scheduled for L+70 days
  - Useful mainly for sanity checks.

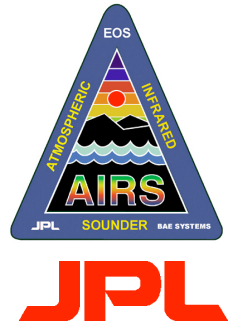
TDS Reprocessing Priorities for Validation



- All Level 1B at L+5 months

- Level 2 match-ups at L+7. Priorities:
  1. ARM and Validation Team sites
  2. Golden Day
  3. Radiosondes and ACARS/MOZAIC
  4. Surface Marine
  5. Synoptic match-ups

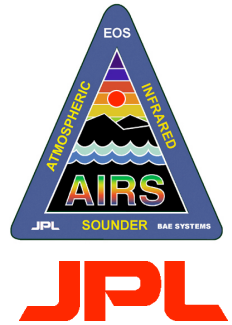
Validation Conclusions



- The dedicated sites and Validation Team experiments are ready to go at around L+2.5
  - We are working on getting sample data to JPL and into TDS
- We have finite computing resources
  - Reprocessing has to be planned accordingly.
- Things get busy with the first stable Level 1B PGE (L+5)
- Things get REALLY busy with RTA delivery at L+7

  …because Level 2 code at JPL must be stabilized around L+9 for delivery to DAAC around L+10!

IEEE Paper
'AIRS / AMSU / HSB Validation'



- Overview, current operational data sets, including Validation Team experiments.
- Twenty-three current authors (!)
- Several sections:
  - I. Intro, including overview and error source discussion
  - II. Routine Data for AIRS Validation
  - III. Special Observations for AIRS / AMSU / HSB Validation
  - IV. Sample Sizes and Error Characteristics of the Correlative Data Sets
  - V. Schedule of Validation Activities
  - VI. Summary